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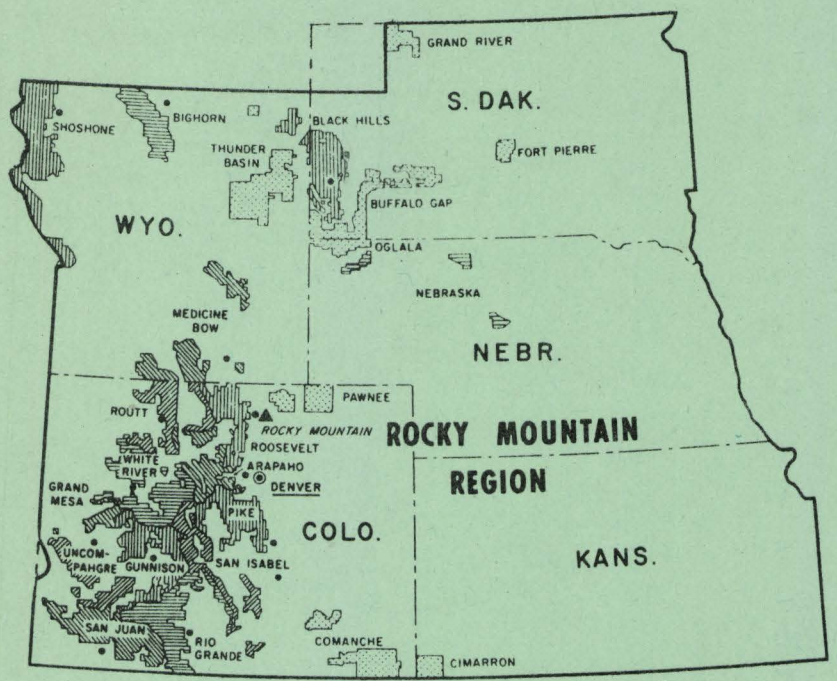
AN EVALUATION SURVEY PROCEDURE FOR DWARF MISTLETOE IN PROPOSED THINNING PROJECTS

Donald Brown



U.S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE
Division of Timber Management
Region 2
Denver, Colorado

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EXPERIMENT STATION

AN EVALUATION SURVEY PROCEDURE FOR DWARF MISTLETOE IN PROPOSED THINNING PROJECTS

Introduction

Current dwarf mistletoe suppression methods utilize the principles of prevention and sanitation through the removal of the source of dwarf mistletoe seeds and cutting of infected trees. The land manager needs reasonably accurate survey data on the intensity, distribution, and impact of the disease in order to make an intelligent decision for or against suppression. The survey data will also aid in establishing priorities for treatment both within and between management units. The same survey procedure can probably be used to evaluate the effectiveness of suppression projects.

Dwarf mistletoe-infected trees usually occur in distinct groups or clusters of different sizes and shapes scattered at varying distances through a stand. The patchy or aggregated distribution of the disease makes it necessary to devise a reasonably accurate and economical sampling scheme. Data collected and analyzed from administrative studies of survey procedures[1/] in 1971 and 1972 indicate that sample points spaced uniformly at 4-chain intervals estimated tree density and proportion of trees infected at ± 6 percent and ± 8 percent of the mean, respectively. A 2-chain interval sampling intensity increased the precision somewhat, but required at least 50 percent more field time. We are recommending the 4-chain interval sampling intensity using the third nearest tree plot design. The survey should average less than ½ man-hour per acre with trained personnel.

The following instructions supersede those issued in 1971 and 1972.

Objective

The dwarf mistletoe survey collects data on the incidence of dwarf mistletoe and tree density through a systematic sample of the stand or stands under consideration. When additional information describing stand condition and structure is combined with this data, structure and projected yield tables can be produced that reflect the impact of the disease.

[1/] James Walters and Donald Brown. An administrative study of sampling techniques in dwarf mistletoe-infected stands. USDA - Forest Service, Denver, Colorado. Unpublished rep., 1973.

Survey Method

Management Unit Selection

The survey is intended primarily for stands that: 1) are known to be infected with dwarf mistletoe, 2) are between 20 and 40 years of age, 3) are included in the special and standard components for commercial forest land, and 4) are scheduled for thinning in the near future. Stands can be delineated according to site index, diameter class (0-4.9 inches, 5.0-7.9 inches, etc.), and a minimum size of 10 acres.

The preselected management unit consisting of one or more stands, with a combined area of at least 40 acres, must be delineated on the ground and on an aerial photo. A smiple reconnaissance or walk-through survey is recommended to organize stands into units that are suitable for management, to delineate the unit boundary, and to avoid situations where mistletoe control is not practical or can be handled in other management activities.

If ground reconnaissance estimates show that over 70 percent or less than 10 percent of the trees are infected and/or less than 10 percent of the area is infested, then the management unit, unless it is reorganized, is not suitable as a suppression project and will not be surveyed using pest control funds. Management units that fall between these limits are suitable prospects for Forest Pest Control suppression funding and can be carried through the survey procedure.

An example of a sample survey for Management Unit X is illustrated in Exhibit A. In the example, only one stand is represented. The individuals making the survey must be properly trained and should be assigned to one qualified individual designated by the District Ranger. A two-member team is recommended, at least to begin with, for measuring and recording the various kinds of information.

Sample Point Examination

The survey will consist of sample points located at 4-chain intervals along parallel compass lines spaced 4 chains apart across the unit being surveyed. Sample points will not be taken within 1 chain of the unit boundary. A maximum of four trees will be examined at each sample point and the appropriate information recorded before proceeding to the next sample point.

The sample point located along a compass line is the center of a variable size plot with a maximum radius of 33 feet in any one direction. The plot is divided into equal quadrants by the intersection of a base line at right angles to the compass line at plot center (Exhibit B). The quadrants are numbered consecutively in either a clockwise or counter-clockwise direction around plot center. A maximum of three living host trees, over a foot in height, in each quadrant are considered on the basis of their proximity to plot center.

For each quadrant, the nearest host tree to plot center is identified as the 1st nearest tree (NT). The next nearest tree to plot center is the 2nd NT and the next nearest tree to plot center, beyond the 1st and 2nd NT, is the 3rd NT. Only those trees within 33* feet of plot center will be considered. The disease code, distance from plot center (to the nearest tenth of a foot), tree height for trees over 1 foot high (to the nearest foot), and tree diameter at 4½ feet above the ground for trees 1" or more in diameter (to the nearest tenth of an inch) are recorded for each 3rd NT within the plot. In addition, age will be determined at stump height on at least one 3rd NT in every other plot. The 3rd NT's are the only trees measured and recorded on the data sheet (Exhibit C). If a 3rd NT falls outside the plot, indicate that it does on the data sheet but do not record any measurements. The same procedure is repeated for all quadrants, working in either a clockwise or counter-clockwise direction (which is standardized for any one survey) around plot center for each sample point in the survey. All sample trees must be representative of the stand being managed.

At least six healthy, vigorous, dominant but immature trees that best represent the growth potential for each stand are selected for site index measurements. The trees should be at least 35 years old, determined at d.b.h. Do not use overmature, stagnated residuals. The radial growth should be reasonably uniform over the life of the tree. The trees may be located in or adjacent to the stand.

Use a separate, clearly identified data sheet for each stand being surveyed. The method of data recording and units of measurement as described above must be applied uniformly in order to facilitate data processing.

Equipment Needed

The basic equipment needed for the survey consists of:

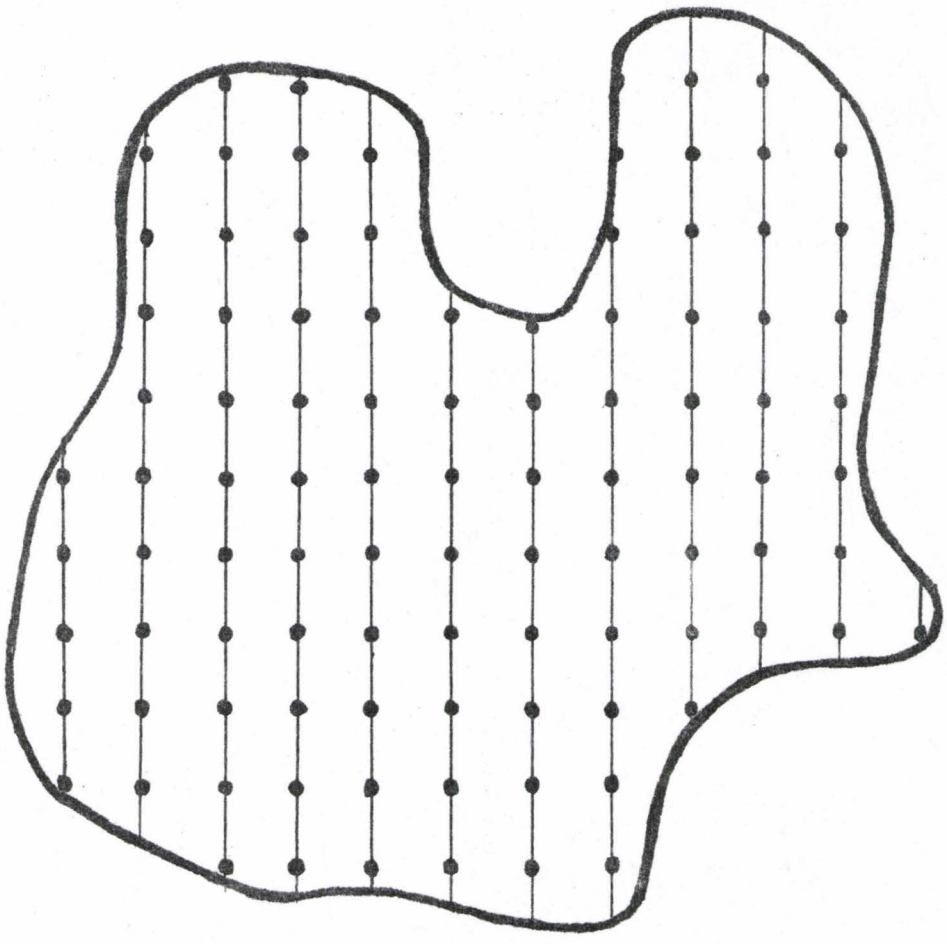
- Aerial photos
- Tatum holder with data sheets
- Diameter tape
- 50-foot tape with 1/10-foot units
- Height finder
- Increment borer and/or hammer
- Scale, in 1/20-inch graduations
- Pocket compass
- Belt axe or folding saw
- First aid kit
- Flagging ribbon

The applicable regulations in the Forest Service Health and Safety Code should be reviewed and applied when conducting the survey.

Prepared by Donald Brown
Pathologist, Division of Timber Management

EXHIBIT A

Example of survey layout for
Management Unit X

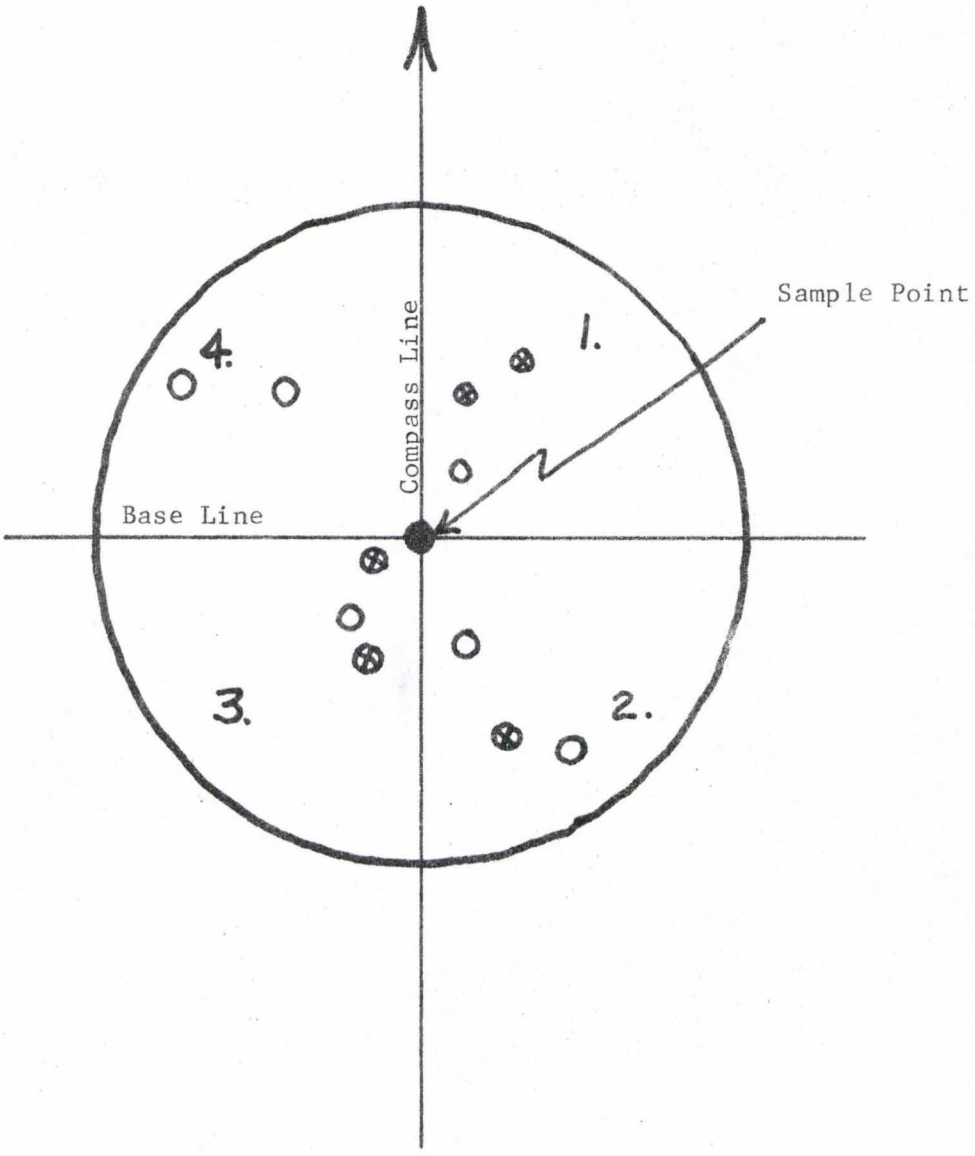


Scale: 8 inches = 1 mile

● sample plot

EXHIBIT B

Example of sample plot



CODE

Healthy tree

DM-infected tree

EXHIBIT C

Page ___ of ___
Date _____

DWARF MISTLETOE SURVEY DATA SHEET

Forest | Ranger District | Working Circle

Compartment | Stand

PLOT DATA

Sample point no.	Quadrant 1 3rd NT				Quadrant 2 3rd NT				Quadrant 3 3rd NT				Quadrant 4 3rd NT				Age	Site index
	Disease code	Height	Diameter	Distance to plot center	Disease code	Height	Diameter	Distance to plot center	Disease code	Height	Diameter	Distance to plot center	Disease code	Height	Diameter	Distance to plot center		Tree 1
																		Tree 2
																		Tree 3
																		Tree 4
																		Tree 5
																		Tree 6
																		Remarks